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Study design

Second generation follow-up of the Danish perinatal study women: Study design and factors affecting response

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Summary To study the mother-infant correlation of fetal growth and duration of pregnancy, women who were born as subjects in the Danish Perinatal Study (1959–61) were traced and interviewed, and the pregnancy and birth records of their children were abstracted. The study population consisted of 159 women who were small-for-gestational age (SGA) at birth, 162 who were preterm, 38 who were both preterm and SGA, and 939 term, appropriately-grown control women. Methods for sample selection, measuring gestational age and fetal growth in both generations, locating and interviewing the women, abstracting the records of their children, and obtaining paternal birth and adult stature are described. A total of 84.5% of the selected women were successfully interviewed; the fraction interviewed did not differ by maternal birth status. The medical records of over 98% of pregnancies to the study women were abstracted, making it possible to study various factors associated with completion of an interview. By a variety of measures, women of higher socio-economic status were more likely to be interviewed. Birthweight and adult weights were available for 63 and 73% of the children's fathers.

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Introduction

Numerous published reports have demonstrated a familial resemblance in size at birth.[1–7] These reports have indicated that women who were small at birth are at increased risk of giving birth to an infant of reduced birthweight. Those studies that have specifically evaluated rate of fetal growth and duration of gestation have reported that maternal birthweight is more strongly associated with fetal growth than with preterm delivery. Only one study[7] has attempted to differentiate mothers who were born preterm from those who were SGA. In contrast to birthweight, gestational age is an imprecisely measured outcome; this imprecision would minimise a true relationship between gestational age across generations.

Limited data exist in the influence of paternal factors on infant size at birth in humans. Genetic studies of maternal and paternal half-sibs have indicated that paternal factors are unimportant in determining birthweight.[8] However, paternal adult height has been reported to be associated positively with fetal growth after controlling for maternal height.[9] There have been no studies of the association between paternal and infant birthweights.

Denmark provides an unusual opportunity to study the intergenerational associations of fetal growth and duration of gestation. Every individual is assigned a unique personal identification number at birth, and the Population Register maintains an up-to-date address for each individual, referenced by this number. The Register also links the identification numbers of children with those of their parents. In addition, old birth records are stored centrally, as are height and weight data for males obtained at the required military draft examination. Finally, from 1959–61, the State University Hospital in Copenhagen was the site of a major prospective study of factors influencing pregnancy outcome and early childhood development. Women born in this study are currently of reproductive age and detailed, standardised records of their own birth, as well as records of their subsequent deliveries, can be obtained.

The present study employed this wealth of data to evaluate the intergenerational associations of various pregnancy outcomes. The purpose of this report is to describe in detail the study methods and to provide data on factors associated with successful completion of an interview.

Methods

Study population

The subjects for this study were drawn from the files of the Danish Perinatal Cohort Study. All deliveries over 20 weeks' gestation occurring at the State University Hospital (Rigshospitalet) in Copenhagen from September 1959 to December 1961 were included in the original study population (n=9125). The project investigators employed a tightly-controlled series of data collection procedures which have been described previously.[10,11] The women were examined regularly throughout the pregnancy and all liveborn infants were examined on the first and fifth days of life by one of three study paediatricians. When these children reached their first birthday, they received special paediatric and developmental examinations.

The Danish Perinatal Cohort was not a representative sample of all births in Denmark during the time period. Rigshospitalet, a unit of the University of Copenhagen, was Denmark's largest academic medical centre and received many referred patients. During 1959–61, the Danish hospital system was centralised, and women from eastern Denmark who had pregnancy complications or who were expected to have difficult deliveries were usually referred to Rigshospitalet. For example, the fraction of births weighing <2500 g among the Perinatal Cohort, 18.7%, was roughly three times that of the general Danish population. In addition, the tendency at that time was for unmarried mothers from Copenhagen to deliver at this hospital. This practice, combined with Rigshospitalet's location in central Copenhagen, resulted in a population of somewhat lower socio-economic status than Denmark as a whole.

Definition of exposure groups

The three exposure groups studied were girls who were preterm, girls who were SGA, and a term, non-SGA control group. Since many pertinent variables in the Perinatal Study were coded in intervals, it was necessary to return to the 1959–61 study records to determine exact birthweight, length and gestational age, which was calculated as follows:

$$\text{Gestation in days} = (\text{birth date} - \text{LMP date}) - (\text{cycle length} - 28)$$

Cases with more than one possible last menstrual period (LMP) qualified as being 'weak' or 'short', with cycles described as irregular, or with a variation in cycle length of 7 days or more were coded as uncertain. Preterm births were defined as having certain gestational ages of less than 259 days (37 competed weeks). SGA girls were those whose gestational age was certain and whose birthweight was less than the tenth percentile for their gestational age and sex according to Danish standards.[12] Potential controls were girls with certain gestations of 259–301 days whose birthweight was at least the tenth percentile for their gestational age (AGA controls).

The records of girls with uncertain gestational ages were examined individually;

there were girls whose stated gestational ages were uncertain but who were clinically determined to be preterm or SGA. Preterm examples include a questionable gestational age of less than 37 weeks with a birthweight of 1100 g, or a record indicating two possible LMP dates, either of which would qualify as preterm. SGA examples include cases with two possible LMP dates, either of which would qualify as SGA. Cases such as these were classified as preterm or SGA without specification of exact gestational age or exact percentile below the tenth.

In order to eliminate nominally preterm girls with misclassified gestational ages, the preterm group was purged of infants with birthweights greater than the 90 percentile for gestational age.[12] In addition, the SGA group was purged of all cases with a gestational age of 295 or more days. Finally, twins and girls who were adopted were excluded from all study groups.

Sample selection

During May 1987, the female subsample of the Danish Perinatal Cohort (n=3962) was searched in the Danish Population Register to determine how many had become parous. The Population Register has existed since 1924 and contains data on all residents from birth or immigration to death or emigration. Since 1969, the Register has included the names and personal identification numbers of the parents and children of each registered citizen. A total of 1874 Cohort women had given birth as of May 1987.

The present study was designed to have a power of 80% to detect a doubled risk of an SGA mother giving birth to an SGA offspring and a doubled risk of a preterm mother giving birth to a preterm offspring, compared with AGA and non-preterm controls, respectively. It was assumed that 10% of AGA mothers would give birth to an SGA child, and 7% of women born at term would give birth to a preterm child. The latter assumption is derived as follows: the fraction of preterm birth in 1985 was 6.9% in the Copenhagen area (annual report of the office of midwives) and 4.3% for all of Denmark. The majority of subjects were expected to reside in the Copenhagen area. Since the study subjects were of lower social class than the general population, their rate of preterm birth was expected to be elevated. The sample size estimates were conservatively based on analysing only one pregnancy per mother; statistical techniques to account for non-independent observations were planned for analysis of all pregnancies. Based on these assumptions, the sample to be contacted and interviewed was planned to include 190 preterm women, 130 who were SGA, and a control group of four term, AGA women per exposed woman (n=760). Controls were selected from among the pool of potential controls as follows: the three exposure groups were divided into seven strata by area of residence (rural, provincial cities and five strata within Copenhagen defined by annual income of the district), and two strata by parity (1 or 2+). Within each residence stratum, a number of controls equal to four times the larger of the two exposure groups was selected for study. Since sub-stratification by parity resulted in many empty cells, and since some women who were para 1 at the time of the first Register search had become para 2 for subsequent searches, stratification by parity was ultimately dropped. The initial study group consisted of 145 SGA women, 140 preterm women, 33 women who were both preterm and SGA, and 800 term, AGA controls. Ninety-two potential controls were not selected, but were retained as 'reserve controls' and 664 parous women were excluded based on one or more of the aforementioned criteria.

To achieve the predetermined sample size goals the Population Register was searched again in May 1989. An additional 22 preterm women, 46 SGA women, five who were preterm and SGA, 210 potential controls and 120 ineligible women became parous. All preterm and 14 SGA women were selected for interview, as were 139 controls. Of these 139 women, 70 were from the original reserve control pool and 69 were identified in the later searches. This substitution was made to expedite medical record abstraction. The total group of women selected for interview included 159 who were SGA at birth, 162 who were preterm, 38 who were SGA and preterm and 939 controls.

The intention of the study was to compare separately the pregnancy outcomes of women who were preterm versus those who were not preterm, and of women who were SGA versus those who were not SGA. For these purposes, a mother who was SGA at term could be considered an unexposed control for a mother who was preterm, and a preterm, AGA infant could be considered an unexposed control for a term SGA infant. When the population was classified this way, there were 200 women who were preterm and 1098 who were not preterm, and 197 women who were SGA and 1101 women who were not SGA.

Data collection

Although primary analysis would be restricted to those women selected for interview, it was originally hoped that the obstetric records of all parous women in the entire Danish Perinatal Cohort would be abstracted if possible. Due to financial and time constraints all records from the selected women and reserve controls were abstracted, as well as records from excluded women who delivered outside Copenhagen; records from excluded women who resided in Copenhagen were to be abstracted as time and resources allowed. The code sheets were pre-tested at several obstetrical wards and midwife centres in Copenhagen; as all record abstractors were fluent in English, the record abstraction forms were not translated into Danish. The same individuals abstracted the records and conducted the subject interview. However, the two operations were carried out independently.

The structured interview consisted predominantly of closed-ended precoded questions, and obtained basic demographic and medical information from each subject. In addition the subjects answered a series of questions for each pregnancy that resulted in a live birth. These questions involved a variety of suspected risk factors for adverse pregnancy outcome. Drafts of the interview were pretested among women under 30 years of age who were admitted to a maternity ward in Copenhagen for delivery of their second child. Midway through the study, all interviewers underwent re-training. The text was originally drafted in English and translated into Danish by study personnel. A separate individual translated the text back into English and discrepancies were resolved. All interviews were carried out in Danish, and took approximately 1 hour to complete. Interviewers were unaware of the subjects' exposure group until the last question of the interview, when the subject was asked if she knew of her own birthweight and gestational age.

Paternal data

The names and personal identification numbers of the fathers of the children born to women in the Perinatal Cohort were obtained from the Population Register. The various midwifery archives located across Denmark were searched to obtain data on paternal birthweight. Paternal gestational age was not available reliably in records of this age and was not collected. All Danish males 18–21 years of age without gross physical or mental disability are required to undergo a military induction examination. Permission to access these records was received from the Ministry of Defence; paternal adult height and weight were abstracted from this source.

Determination of second generation outcomes

Birthweight, length and head circumference were obtained from the delivery record. Gestational age was calculated from the date of the LMP, supplemented by early (≤20 week) ultrasound when present. When two or more ultrasound examinations were present, the earliest one was used. To determine the basis for calculating gestational age, each abstracted record was reviewed by an obstetrician (C.S. or N.J.S.) who was unaware of the maternal exposure group. Methods for calculating second generation gestational age are summarised in Table 1; this determination was made without consideration of the child's birthweight.

LMP-based gestations were corrected for cycle length as above. Ultrasound-based gestation was derived from the biparietal diameter (BPD) using the following formula:

$$\text{Gestation at Exam} = 2.2365 \times \text{BPD} + 34.74$$

Table 1. Determination of gestational age in second generation pregnancies

Certain LMP*	Ultrasound†	Gestation	Certainty	%
Yes	None or >20 weeks	LMP	Certain	35
Yes	≤20 weeks, Agrees‡	LMP	Certain	28
No	≤20 weeks	Ultrasound	Certain	20
Yes	≤20 weeks, Disagrees	Ultrasound	Approximate	1
No§	None or >24 weeks	LMP	Approximate	6
No	None or >24 weeks	LMP	Uncertain	8
No	>20 to 24 weeks	Ultrasound	Approximate	3

* Known date of last menstrual period, cycles with less than 7 days variation, compatible uterine size, no oral contraceptive use within 4 months of last menstrual period. When cycle length was not stated or cycles were irregular, 28 days was assumed.
† Gestational age at earliest ultrasound.
‡ Ultrasonic estimate within 2 weeks of menstrual estimate.
§ Oral contraceptive use within 4 months of an otherwise certain LMP.

When a BPD was not available, the crown-rump length was used.[13] The days elapsed from the date of the earliest ultrasound to delivery were added to this value to obtain the estimated gestation at delivery. Preterm delivery was defined as a live birth of gestation less than 259 days, or a stillbirth of 196–258 days or younger if the birthweight was at least 1000 g. SGA was defined as a birthweight less than the 10th percentile for sex and gestational age based on Danish standards.[12]

Statistical analysis

Continuous variables were compared using the Student's *t*-test; categorical variables were compared using the chi-squared test. The median dates of birth of women interviewed and those selected for interview but not actually interviewed were compared using the Wilcoxon rank-sum test. When comparing the mean birthweights of all infants of women interviewed and not interviewed, the SURREGR program for the Statistical Analysis System (SAS) was used.[14] This program, originally designed for the analysis of complex survey data, adjusts the variance of parameter estimates for non-independence within the primary sampling unit. In these analyses, the mother was regarded as the primary sampling unit, and *P*-values are corrected for the within-mother correlation of pregnancy outcomes.

Since the number of pregnancies producing liveborn children among the study women was obtained by two independent sources (record review and self-report), the total number of such pregnancies was estimated using capture-recapture methodology.[15] This technique uses the number of pregnancies reported by the women, the number found in the records, and the number common to both sources to estimate the number missed by both sources.

Results

One thousand two hundred and ninety-eight parous women were selected for interview; 1097 of them (84.5%) were actually interviewed. The vast majority (1079) of interviews were face-to-face, the remainder being via telephone (13) or letter (five). Three cohort members (0.2%) had died, 19 (1.5%) had emigrated and 74 (5.7%) were contacted but refused to be interviewed. The remaining (105 [8.1%]) either could not be contacted or agreed to be interviewed but failed repeatedly to keep appointments. The fraction interviewed did not differ significantly by maternal exposure group—88.1% for SGA women, 85.8% for preterm women, 89.5% for women who were both SGA and preterm at birth and 83.5% for the term AGA controls (P=0.36). When women were classified as preterm/not preterm and SGA/not SGA, the number of women in each group was 173/924 and 174/923.

The distribution of residence at the time of interview for the 1298 women in the cohort is as follows: 25.9% lived in rural districts or small towns and 2.3% lived in provincial cities. The five income-defined strata within Copenhagen contributed 20.5%, 8.8%, 24.3%, 7.8% and 1.8% of the women (from lowest to highest income); residence stratum was missing for 8.6% of the cohort. The fractions interviewed were 88.1% for women living in rural districts and small towns, 86.7% for women living in provincial cities, 75.2, 87.7, 83.8, 87.1 and 87.5% for the five income strata in Copenhagen, and 91.1% for women whose stratum was missing (overall P for difference <0.001).

Medical records were obtained for 2091 pregnancies of 20 or more weeks' gestation of the 1298 women selected for study, including 1768 pregnancies of the 1097 women actually interviewed. Interview data were obtained for 1699 of these 1768 pregnancies. An additional 27 pregnancies were mentioned by the women but records could not be located; approximately half of these deliveries occurred outside Denmark and the remainder were untraceable. Using capture-recapture methodology, we calculate that an additional two pregnancies (95% confidence interval = 0–4) were missed by both sources.

As medical records were retrieved for all cohort women regardless of whether an interview was completed, we were able to evaluate the association between response and several characteristics noted in the records. Records not collected for research purposes are notoriously incomplete, and the category 'data missing' had to be included as a legitimate value for categorical variables in this analysis. Except for birthweight of all children born to the study women, pregnancy-related data are taken from records of the first pregnancy experienced by each woman. The results are displayed in Table 2.

Table 2. Maternal characteristics associated with completion of an interview

Characteristic	*n*	Percentage Interviewed	*P* value
Parity as of 1989			
1	758	85.4	
2+	451	82.0	0.13
Post-secondary education			
None	479	82.7	
Semi-skilled	87	86.2	
Skilled	332	90.4	
Higher education	100	97.0	
No data	300	76.3	<0.001
Social class—maternal occupation			
Unskilled	176	80.7	
Semi-skilled	199	88.4	
Skilled	147	89.8	
Office work, lab. assistant	275	91.3	
Middle exam (e.g. kindergarten teacher, small business)	61	93.4	
Lower academic	19	89.5	
Academic	25	92.0	
No occupation	292	76.4	
No data	104	73.1	<0.001
Employed during pregnancy			
No	332	77.1	
Yes	834	89.3	
No data	132	72.7	<0.001
Marital status			
Unmarried, not cohabiting	145	76.6	
Unmarried, cohabiting	594	87.4	
Married	366	86.9	
Formerly married	7	85.7	
No data	186	76.3	<0.001

Characteristic	*n*	Percentage Interviewed	*P* value
Father's presence during pregnancy			
Did not live with mother	147	79.6	
Lived with mother	946	87.2	
No data	205	75.6	<0.001
Quality of housing			
Poor	107	80.4	
Average	73	74.0	
Good	559	89.1	
No data	559	82.1	<0.001
Tobacco use during pregnancy			
No	360	87.8	
Yes	471	84.5	
No data	467	82.0	0.08
Alcohol use during pregnancy			
None	469	86.1	
Any	171	86.6	
No data	650	82.8	0.22

	Mean value Interviewed	Not interviewed	
Age at first birth (years)	22.4	21.2	<0.001
Height (cm)	166.2	166.0	0.76
Pre-pregnancy weight (kg)	58.5	57.4	0.19
Number of cigarettes per day	5.8	7.1	0.046
Maternal date of birth*	30/9/60	20/8/60	0.10
Infant birthweight (first pregnancies)	3289	3227	0.21
Infant birthweight (all pregnancies)	3305	3202	0.051†

* Median, *P*-value from Wilcoxon rank-sum test
† *P*-value corrected for non-independence of data

As measured by a variety of indicators (age at first birth, education, type of occupation, employment and social situation) women who completed an interview were of higher socio-economic status than those who were not interviewed. There was a weak trend for non-interviewed women to smoke more than interviewed women, but the large fraction of missing data limits this conclusion. Interestingly, in spite of the almost complete record abstraction and independence of abstraction and interview, women whose medical records contained missing data were less likely to be interviewed than women with all data present. Elimination of women who emigrated did not change this finding. Physical stature did not differ between interviewed and non-interviewed women. Non-interviewed women had firstborn infants 62 g lighter on average than interviewed women (P=0.21). This difference increased to 103 g and was of borderline statistical significance when all pregnancies were considered.

Among all Danish women born in 1960, 42% had given birth to at least one child by age 25;[16] among the perinatal cohort women, 1758 of 3962 (44%) had given birth by age 25. In 1986–87, 49% of Danish women age 25–34 smoked tobacco daily;[16] 65% of interviewed women stated that they currently smoked. In 1987, 3% of Danish women age 20–34 had 7 or fewer years of education;[16] 0.8% of interviewed women reported completing 7 years or fewer years of school. Conversely, 26% of 20–34 year old Danish women completed their upper secondary (Student-HF) exam, compared with 19% of interviewed women. 62% of Danish women age 25–34 had children and were cohabiting, while 9% were single parents, implying that 87% (62/[62+9]) of women with children lived in a 'two-parent' household. At the time of interview, 79% of the study women were married or cohabiting and 21% were not; interviewed women were therefore approximately 60% (21/13%) more likely than Danish women of similar age to be a single parent.

The 1768 children whose records were abstracted and whose mothers were interviewed had 1222 different fathers. Birthweight was obtained for 768 (63%) fathers; weight at the military induction exam was obtained for 893 (73%) fathers. The availability of paternal birthweight did not differ according to maternal birth status (63.6% for SGA mothers, 62% for preterm, 65.9% for preterm and SGA, and 62.7% for term, AGA mothers, P=0.96). The presence of data on paternal adult weight differed significantly by maternal status however (71.3% for SGA, 70.6% for preterm, 90.9% for preterm and SGA, and 73.0% for controls, P=0.048). The presence of data on paternal birth length and adult height mirrored their respective weights.

In general, the absence of paternal data was modestly associated with several measures of lower social class. During the maternal interview, women were asked about paternal birth date. Among interviewed women, the median birth date was 5 October 1958 for fathers with known birthweight, compared with 4 March 1956 for fathers with unknown birthweight (P<0.001, Wilcoxon rank sum test). The median birth dates for fathers with known and unknown adult weight were 5 April 1958 and 23 October 1957, respectively (P=0.19). However, the absence of either paternal birth or adult weight was unassociated with infant birthweight.

Discussion

The co-existence of several conditions makes this Danish population nearly ideally suited for the study of the transgenerational association of pregnancy outcomes. Firstly, the original birth records from 1959–1961 contained personal identification numbers, and were assembled as part of a specific research project that employed strictly contolled procedures. These procedures resulted in a minimal amount of missing data and a uniformly high quality of the data that were collected, resulting in the most accurate determination possible of gestational age and fetal growth, given the era in which the births occurred.

Secondly, the Population Register links the identification number of each resident to those of their children and parents. Maintaining a current address with the Population Register is a legal requirement to receive the numerous social benefits accorded Danish residents. The Register enabled us to locate all of the original cohort women and determine which of them had had children; it also enabled us to locate and abstract the records of over 98% of children born to the selected women (and 99% of children born in Denmark).

Thirdly, we were able to abstract the records of all children born to the cohort women, regardless of whether they were actually interviewed. This allows us to study pregnancy outcomes without concern for biases due to non-response. The availability of multiple sources of data will in addition enable us to quantify any response-related biases that may exist. Fourthly, central storage of birth and conscription records made it possible to obtain prospectively collected data on paternal stature at birth and young adulthood for a substantial fraction of the study pregnancies.

Many adult characteristics of the cohort women were similar, but not identical to comparably-aged Danish women. The studied women were slightly more likely to have had children by age 25, and cohort women actually interviewed were more likely to smoke and to be a single parent. Interviewed women were less likely than the general population to have very low or very high levels of education. In many of these instances, direct comparison with published statistics is difficult, since everyone in the study population was, by definition, parous but less than half of similarly-aged Danish women had ever given birth. The reduced age at first birth, the relatively lower level of education and the increased prevalence of smoking and single parenthood is likely to be due to the original composition of the population in 1959–61, which was predominantly drawn from Copenhagen, and was of relatively low social class. The relative under-representation among interviewees of women with 7 or fewer years of school may be due to a reduced rate of response to interview requests, but this is speculative.

It has proved difficult to study the intergenerational correlation of gestational age and rate of fetal growth.[17] Pregnancy may end by a heterogeneous group of mechanisms—idiopathic spontaneous labour is most common, but many births follow a complication that either leads to spontaneous labour or results in a medical decision to interrupt the pregnancy. The present study will investigate this issue, as mode of onset of labour and indications for interruption of pregnancy were collected in both generations. A second problem has been the inability to estimate gestational age accurately. This results in misclassification of both preterm and SGA status, and would dilute any true associations that may exist.

This study took great care to obtain accurate estimates of gestation in both generations. In the 1959–61 pregnancies, the design required that the LMP be of certain date and normal characteristics and that cycles be regular. Women whose birthweight was inappropriately large for their stated gestation were also eliminated. Most second-generation records provide specific data, recorded at the time of the initial prenatal visit, on the presence of clinical uncertainty of gestation. Prenatal care in Denmark is widely accessible and without cost; most women have their first visit early in pregnancy when both physical examination and recall of menses are most accurate. In addition, early obstetrical ultrasound results were available for nearly half of all second generation pregnancies. Very few second-generation infants with birthweights unreasonably large for their calculated gestations were found.

We eliminated from the preterm group women whose birthweights were over the 90th percentile for their gestational age. The birthweight distribution at early menstrual gestations is bimodal;[18] interpretation of this observation is controversial.[19,20] Preterm infants may have rapid growth rates and the use of ultrasound, which estimates time from size, may employ circular reasoning to arrive at unimodal birthweight distributions for early gestations.[20] Since it was not possible to determine who among the large preterm women was growing rapidly and who had an erroneous gestational age, we elected not to study these women. Similarly, diagnosing SGA requires accurate determination of gestational age and we were reluctant to accept gestations of over 294 days at face value. We were, however, confident that the vast majority of these 'prolonged' pregnancies were not preterm, and have therefore included them in comparisons involving women who were preterm or not preterm at birth. Since the birthweights of study women born at gestations of 295–301 days were all over the 10th percentile for term births, these women could properly be used as unexposed controls for women who were SGA at birth.

In summary, methods used to study duration of pregnancy and fetal growth in children born to female subjects of the 1959–61 Danish Perinatal Study were described. Preterm, SGA and group of term, normally grown women were selected and interviewed. Denmark's extensive record linkage provided almost complete follow-up of all children born to study women, as well as the collection of data on paternal birth and adult stature.

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Announcement

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Prevention 93 will bring together leaders and experts from governmental agencies, foundations, managed care and other clinical settings, insurance, industry and academia to explore the scientific advances that have moved prevention to the forefront of health care issues and corporate policy and to examine the overall role of prevention in health care reform.

Participants will examine the roles and responsibilities of public health, organised medicine, the private sector and individuals in the proposed health care systems. Major areas of consideration will be access and delivery, the relationship between prevention and primary care, the inclusion of public health and clinical preventive services and the costs—human and economic—of including or excluding prevention strategies in health care reform. The manner in which preventionists are trained will also be explored to determine how to adapt the training of preventive medicine specialists to the evolving system and how to integrate prevention into the training of generalist physicians and other health professionals.

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